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**AIR QUALITY IMPACT ANALYSIS FOR THE  
PROPOSED SANTA CLARA SQUARE PROJECT, CITY OF SANTA CLARA**

Prepared for:  
Mindigo & Associates  
1984 The Alameda  
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## **EXISTING CONDITIONS**

### **Air Pollution Climatology**

The amount of a given pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain and, for photochemical pollutants, sunshine.

Northwest winds and northerly winds are most common in the project area, reflecting the orientation of the Bay and the San Francisco Peninsula. Winds from these directions carry pollutants released by autos and factories from upwind areas of the Peninsula toward Santa Clara, particularly during the summer months. Winds are lightest on the average in fall and winter. Every year in fall and winter there are periods of several days when winds are very light and local pollutants can build up.

Pollutants can be diluted by mixing in the atmosphere both vertically and horizontally. Vertical mixing and dilution of pollutants are often suppressed by inversion conditions, when a warm layer of air traps cooler air close to the surface. During the summer, inversions are generally elevated above ground level, but are present over 90 percent of the time in both the morning and afternoon. In winter, surface-based inversions dominate in the morning hours, but frequently dissipate by afternoon.

Topography can restrict horizontal dilution and mixing of pollutants by creating a barrier to air movement. The South Bay has significant terrain features that affect air quality. The Santa Cruz Mountains and Hayward Hills on either side of the South Bay restrict horizontal dilution, and this alignment of the terrain also channels winds from the north to south, carrying pollution from the northern Peninsula toward Santa Clara.

The combined effects of moderate ventilation, frequent inversions that restrict vertical dilution and terrain that restrict horizontal dilution give Santa Clara a relatively high atmospheric potential for pollution compared to other parts of the San Francisco Bay Air Basin and provide a high potential for transport of pollutants to the east and south.

### **Ambient Air Quality Standards**

#### Criteria Pollutants

Both the U. S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. Table 1 identifies the major criteria pollutants, characteristics, health effects and typical sources. The federal and California

state ambient air quality standards are summarized in Table 2.

The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects.

As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>)

The U.S. Environmental Protection Agency established new national air quality standards for ground-level ozone and for fine particulate matter in 1997. The existing 1-hour ozone standard of 0.12 PPM (microns or less) is to be phased out and replaced by an 8-hour standard of 0.08 PPM. Implementation of the 8-hour standard was delayed by litigation, but was determined to be valid and enforceable by the U. S. Supreme Court in a decision issued in February of 2001.

Suspended particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. "Inhalable" PM consists of particles less than 10 microns in diameter, and is defined as "suspended particulate matter" or PM<sub>10</sub>. Fine particles are less than 2.5 microns in diameter (PM<sub>2.5</sub>). PM<sub>2.5</sub>, by definition, is included in PM<sub>10</sub>.

In 1997 new national standards for fine Particulate Matter (diameter 2.5 microns or less) were adopted for 24-hour and annual averaging periods. The current PM<sub>10</sub> standards were to be retained, but the method and form for determining compliance with the standards were revised.

The State of California regularly reviews scientific literature regarding the health effects and exposure to PM and other pollutants. On May 3, 2002, the California Air Resources Board (CARB) staff recommended lowering the level of the annual standard for PM<sub>10</sub> and establishing a new annual standard for PM<sub>2.5</sub> (particulate matter 2.5 micrometers in diameter and smaller). The new standards became effective on July 5, 2003.

### Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde.

Public exposure to TACs can result from emissions from normal operations, as well as

Table 1: Major Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen. Often called photochemical smog.	<ul style="list-style-type: none"> <li>● Eye Irritation</li> <li>● Respiratory function impairment.</li> </ul>	The major sources ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	<ul style="list-style-type: none"> <li>● Impairment of oxygen transport in the bloodstream.</li> <li>● Aggravation of cardiovascular disease.</li> <li>● Fatigue, headache, confusion, dizziness.</li> <li>● Can be fatal in the case of very high concentrations.</li> </ul>	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	Reddish-brown gas that discolors the air, formed during combustion.	<ul style="list-style-type: none"> <li>● Increased risk of acute and chronic respiratory disease.</li> </ul>	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants.
Sulfur Dioxide	Sulfur dioxide is a colorless gas with a pungent, irritating odor.	<ul style="list-style-type: none"> <li>● Aggravation of chronic obstruction lung disease.</li> <li>● Increased risk of acute and chronic respiratory disease.</li> </ul>	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	<ul style="list-style-type: none"> <li>● Aggravation of chronic disease and heart/lung disease symptoms.</li> </ul>	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.

Table 2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour 8-Hour	0.12 PPM 0.08 PPM	0.09 PPM --
Carbon Monoxide	8-Hour 1-Hour	9.0 PPM 35.0 PPM	9.0 PPM 20.0 PPM
Nitrogen Dioxide	Annual Average 1-Hour	0.05 PPM --	-- 0.25 PPM
Sulfur Dioxide	Annual Average 24-Hour 1-Hour	0.03 PPM 0.14 PPM --	-- 0.05 PPM 0.25 PPM
PM <sub>10</sub>	Annual Average 24-Hour	50 µg/m <sup>3</sup> 150 µg/m <sup>3</sup>	20 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>
PM <sub>2.5</sub>	Annual 24-Hour	15 µg/m <sup>3</sup> 65 µg/m <sup>3</sup>	12 µg/m <sup>3</sup> --
Lead	Calendar Quarter 30 Day Average	1.5 µg/m <sup>3</sup> --	-- 1.5 µg/m <sup>3</sup>
Sulfates	24 Hour	25 µg/m <sup>3</sup>	--
Hydrogen Sulfide	1-Hour	0.03 PPM	--
Vinyl Chloride	24-Hour	0.01 PPM	--

PPM = Parts per Million

µg/m<sup>3</sup> = Micrograms per Cubic Meter

accidental releases. Health effects of TACs include cancer, birth defects, neurological damage and death.

## **Ambient Air Quality**

### Criteria Air Pollutants

Area Air Quality Management District (BAAQMD) monitors air quality at several locations within the San Francisco Bay Air Basin. The closest multi-pollutant monitoring site to the project site is located in downtown San Jose on Fourth Street. Table 3 summarizes exceedances of State and Federal standards at this monitoring site during the period 2000-2002. Table 3 shows that ozone and PM<sub>10</sub> exceed the state standards in the South Bay. Violations of the carbon monoxide standards had been recorded at the downtown San Jose site prior to 1992.

The Bay Area Air Quality Management District began monitoring for a single pollutant (ozone) at 910 Ticonderoga Drive in neighboring Sunnyvale in 2001. No violations of the ozone standards (state or federal) were recorded at this location in 2001-2002.

Of the three pollutants known to at times exceed the state and federal standards in the project area, two are regional pollutants. Both ozone and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are considered regional pollutants in that concentrations are not determined by proximity to individual sources, but show a relative uniformity over a region. Thus, the data shown in Table 3 for ozone and PM<sub>10</sub> provide a good characterization of levels of these pollutants on the project site.

Carbon monoxide is a local pollutant, i.e., high concentrations are normally only found very near sources. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes.

### Toxic Air Contaminants

The air monitoring network operated by the District includes gaseous samples collected over 24-hour periods on a 12-day sampling frequency. The network began in 1986 with six sites, and has gradually been expanded to its present size of 20 sites. The analytical protocol includes the following 12 gaseous compounds: benzene, carbon tetrachloride, chloroform, ethylene dibromide, ethylene dichloride, methyl tert butyl ether (MTBE), methylene chloride, perchloroethylene, toluene, trichloroethane, trichloroethylene, and vinyl chloride. Year 2001 data from the San Jose Fourth Street monitoring site are shown in Table 4.

As part of the Children's Environmental Health Protection Program, the California Air Resources Board (CARB) performed monitoring programs in six communities around the

Table 3: Summary of Criteria Pollutant Air Quality Data for San Jose Fourth Street Site

Pollutant	Standard	Days Exceeding Standard in:		
		2000	2001	2002
Ozone	Federal 1-Hour	0	0	0
Ozone	State 1-Hour	0	2	0
Ozone	Federal 8-Hour	0	0	0
Carbon Monoxide	State/Federal 8-Hour	0	0	0
Nitrogen Dioxide	State 1-Hour	0	0	0
PM <sub>10</sub>	Federal 24-Hour	0	0	0
PM <sub>10</sub>	State 24-Hour	7	4	0
PM <sub>2.5</sub>	Federal 24-Hour	0	0	0

Source: California Air Resources Board, Aerometric Data Analysis and Management System (ADAM), ([www.arb.ca.gov/adam/](http://www.arb.ca.gov/adam/)), 2003.

**Table 4. Summary of 2001 Ambient Air Toxics Monitoring Data for San Jose Fourth Street Site**

<b>Compound</b>	<b>LOD (ppb)</b>	<b>% of Samples &lt; LOD</b>	<b>Maximum Conc. (ppb)</b>	<b>Minimum Conc. (ppb)</b>	<b>Mean Conc. (ppb)</b>
Benzene	0.10	0	2.50	0.20	0.68
Chloroform	0.02	94	0.08	<0.02	0.02
Carbon Tetrachloride	0.01	0	0.11	0.09	0.10
Ethylene Dibromide	0.02	100	<0.02	<0.02	<0.02
Ethylene Dichloride	0.10	100	<0.10	<0.10	<0.10
Methyl Tert Butyl Ether	0.50	29	4.60	<0.50	0.96
Methylene Chloride	0.50	94	0.60	<0.50	0.27
Perchloroethylene	0.01	3	0.22	<0.01	0.06
Toluene	0.10	0	5.40	0.30	1.49
1, 1, 1 - Trichloroethane	0.05	23	0.09	<0.05	0.05
Trichloroethylene	0.08	100	<0.08	<0.08	<0.08
Vinyl Chloride	0.30	100	<0.30	<0.30	<0.30

LOD = the limit of detection of the analytical method used.

ppb = parts per billion

Source: Bay Area Air Quality Management District, Toxic Air Contaminant Control Program Annual Report 2001, July 2003.

state where children are typically present, such as schools and daycare centers, and near sources of air pollution, including busy highways and industry. At each site, approximately 40 toxic air pollutants were measured. The closest location to the project site was the Lockwood Elementary School in Oakland.

The results of the monitoring and health risk analysis at the Lockwood Elementary School were:<sup>1</sup>

- Total risk from the 10 most important TACs was calculated as 676 in one million.
- About 71% of the total risk was attributable to diesel particulate.
- Benzene contributed approximately 8% of the calculated potential cancer risk.
- Formaldehyde contributed approximately 2% of the calculated potential cancer risk.
- 1,3-butadiene contributed approximately 10% of the calculated potential cancer risk.
- Acetaldehyde contributed less than 1% of the calculated potential risk.

### **Attainment Status and Regional Air Quality Plans**

The federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas". Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

The Bay Area currently had until recently attained all federal standards. In June of 1998 the U.S. Environmental Protection Agency reclassified the Bay Area from "maintenance area" to nonattainment for ozone based on violations of the federal standards at several locations in the air basin. This reversed the air basin's reclassification to "maintenance area" for ozone in 1995. Reclassification required an update to the region's federal air quality plan.

Under the California Clean Air Act Santa Clara County is a nonattainment area for ozone and PM<sub>10</sub>. The county is either attainment or unclassified for other pollutants. The California Clean Air Act requires local air pollution control districts to prepare air quality attainment plans. These plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or if not, provide for adoption of "all feasible measures on an expeditious schedule".

### **Sensitive Receptors**

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically

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<sup>1</sup> [www.arb.ca.gov/ch/airquality/fruitvale/fv\\_cancerrisk.pff](http://www.arb.ca.gov/ch/airquality/fruitvale/fv_cancerrisk.pff)

ill) are likely to be located. These land uses include residences, schools playgrounds, child care centers, retirement homes, convalescent homes, hospitals and medical clinics. The closest sensitive receptors are residences located north and south of the site.

### **Significance Criteria**

The document BAAQMD CEQA Guidelines<sup>2</sup> provide the following definitions of a significant air quality impact:

- A project contributing to carbon monoxide (CO) concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours or 20 ppm for 1 hour would be considered to have a significant impact.
- A project that generates criteria air pollutant emissions in excess of the BAAQMD annual or daily thresholds would be considered to have a significant air quality impact. The current thresholds are 15 tons/year or 80 pounds/day for Reactive Organic Gases (ROG), Nitrogen Oxides (NO<sub>x</sub>) or PM<sub>10</sub>. Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.
- Any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact.
- Any project with the potential to expose sensitive receptors or the general public to substantial levels of toxic air contaminants would be deemed to have a significant impact.

The BAAQMD significance threshold for construction dust impact is based on the appropriateness of construction dust controls. The BAAQMD guidelines provide feasible control measures for construction emission of PM<sub>10</sub>. If the appropriate construction controls are to be implemented, then air pollutant emissions for construction activities would be considered less-than-significant.

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<sup>2</sup> Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised December 1999).

## **IMPACTS**

### **Construction-Related Impacts**

The proposed project would require demolition of existing infrastructure and a building. The physical demolition of existing structure and other infrastructure are construction activities with a high potential for creating air pollutants. In addition to the dust created during demolition, substantial dust emissions could be created as debris is loaded into trucks for disposal.

The California Health and Safety Code requires that local agencies not issue demolition permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding asbestos, lead-based paint and other potentially hazardous building materials. The Bay Area Air Quality Management District is vested by the California Legislature with authority to regulate airborne pollutants through both inspection and law enforcement, and is to be notified ten days in advance of any proposed demolition and must provide information on the amount and nature of any hazardous pollutants, nature of planned work and methods to be employed, and the name and location of the waste disposal site to be used. The purpose of BAAQMD regulations is the minimization of the potential hazards to the public and surrounding land uses.

The project must also comply with California Occupational Safety and Health Administration (Cal/OSHA) regulations, standards and procedures and California Department of Health Services (DHS) Lead Work Practice Standards. These regulations are designed to minimize worker and general public exposure to hazardous building materials.

The above regulations and procedures, already established and enforced as part of the permit review process, would ensure that any potential impacts due to asbestos, lead or other hazardous materials would be reduced to a level of insignificance.

After demolition activities, construction dust would continue to affect local air quality during construction of the project. The dry, windy climate of the area during the summer months creates a high potential for dust generation when and if underlying soils are exposed to the atmosphere.

The effects of construction activities would be increased dustfall and locally elevated levels of PM<sub>10</sub> downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties. This impact is considered potentially significant.

### **Permanent Local Impacts**

On the local scale, the project would change traffic on the local street network, changing carbon monoxide levels along roadways used by project traffic. Carbon monoxide is an odorless, colorless poisonous gas whose primary source in the Bay Area is automobiles. Concentrations of this gas are highest near intersections of major roads.

Carbon monoxide concentrations under worst-case meteorological conditions have been predicted for signalized intersections affected by project. These intersections were selected as worst case based on intersection Level Of Service. PM peak traffic volumes were applied to the a screening form of the CALINE-4 dispersion model to predict maximum 1- and 8-hour concentrations near these intersections under the worst-case assumption that background and project traffic changes would occur in 2004. Appendix 1 provides a description of the model and a discussion of the methodology and assumptions used in the analysis. The model results were used to predict the maximum 1- and 8-hour concentrations, corresponding to the 1- and 8-hour averaging times specified in the state and federal ambient air quality standards for carbon monoxide.

Table 5 shows the results of the CALINE-4 analysis for the peak 1-hour and 8-hour traffic periods in parts per million (PPM). The 1-hour values are to be compared to the federal 1-hour standard of 35 PPM and the state standard of 20 PPM. The 8-hour values in Table 5 are to be compared to the state and federal standard of 9 PPM.

Table 5 shows that existing predicted concentrations near the intersections meet the 1-hour and 8-hour standards. Concentrations with background traffic increases would be up to 1.7 PPM above existing levels. Traffic from the proposed project would increase concentrations by up to 0.1 PPM, but concentrations would remain below the most stringent state or federal standards.

Since project traffic would not cause any new violations of the 8-hour standards for carbon monoxide, nor contribute substantially to an existing or projected violation, project impacts on local carbon monoxide concentrations are considered to be less-than-significant.

### **Permanent Regional Impacts**

Vehicle trips generated by the project would result in air pollutant emissions affecting the entire San Francisco Bay Air Basin. Regional emissions associated with project vehicle use has been calculated using the URBEMIS2002 emission model. The methodology used in estimating vehicular emissions is described in Attachment 2.

The incremental daily emission increase associated with project land uses is identified in Table 6 for reactive organic gases and oxides of nitrogen (two precursors of ozone) and PM<sub>10</sub>. The Bay Area Air Quality Management District has established threshold of significance for ozone precursors and PM<sub>10</sub> of 80 pounds per day. Proposed project emissions shown in Table 6 would not exceed these thresholds of significance, so the proposed project would have a less-than-significant effect on regional air quality.

Table 5: Worst Case Carbon Monoxide Concentrations Near Selected Intersections, in PPM

Intersection	Existing (2004)		Existing + Background (2004)		Existing + Background+ Project (2004)	
	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr
El Camino Real/ Bowers	11.8	6.2	12.3	6.6	12.3	6.6
Lawrence/ Arques	13.7	7.5	14.2	7.9	14.3	8.0
Lawrence/ Kifer	14.1	7.8	15.0	8.4	15.1	8.5
Lawrence/ Monroe	14.2	7.9	14.9	8.4	15.0	8.4
Lawrence/ Benton	13.0	7.1	14.3	8.0	14.4	8.0
Lawrence/ Homestead	12.5	7.0	14.2	8.2	14.3	8.3
Lawrence/ I-280	11.9	6.6	11.4	6.9	11.4	6.9
Most Stringent Standard	20.0	9.0	20.0	9.0	20.0	9.0

Table 6: Project Regional Emissions in Pounds Per Day

	<b>Reactive Organic Gases</b>	<b>Nitrogen Oxides</b>	<b>PM<sub>10</sub></b>
Project Buildout	71.4	71.7	68.8
BAAQMD Significance Threshold	80.0	80.0	80.0

### **III. MITIGATION MEASURES**

#### **Construction**

Require implementation of the following dust control measures by contractors during demolition of existing structures:

- Watering should be used to control dust generation during demolition of structures and break-up of pavement.
- Cover all trucks hauling demolition debris from the site.
- Use dust-proof chutes to load debris into trucks whenever feasible.

Require implementation of the following dust control measures by construction contractors during all construction phases:

- Water all active construction areas at least twice daily.
- Watering or covering of stockpiles of debris, soil, sand or other materials that can be blown by the wind.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (preferably with water sweepers) all paved access road, parking areas and staging areas at construction sites.
- Sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas.
- Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Implementation of the measures would reduce construction impacts of the project to a less than significant level.

## **ATTACHMENT 1: CALINE-4 MODELING**

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located within 150 meters of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc.

A screening-level form of the CALINE-4 program was used to predict concentrations.<sup>3</sup> Normalized concentrations for each roadway size (2 lanes, 4 lanes, etc.) are adjusted for the two-way traffic volume and emission factor. Calculations were made for a receptor at a corner of the intersection, located 25 feet from the curb. Emission factors were derived from the California Air Resources Board EMFAC2002 computer program based on a 2004 Bay Area vehicle mix.

The screening form of the CALINE-4 model calculates the local contribution of nearby roads to the total concentration. The other contribution is the background level attributed to more distant traffic. The 1-hour background level in 2004 was taken as 8.5 PPM and the 8-hour background concentration was taken as 3.9 PPM. These backgrounds were estimated using isopleth maps and correction factors developed by the Bay Area Air Quality Management District.

Eight-hour concentrations were obtained from the 1-hour output of the CALINE-4 model using a persistence factor of 0.7.

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<sup>3</sup> Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1999.

## **ATTACHMENT 2: NEW VEHICLE TRAVEL EMISSIONS**

Estimates of regional emissions generated by project traffic were made using a program called URBEMIS-2002.<sup>4</sup> URBEMIS-2002 is a program that estimates the emissions that result from various land use development projects. Land use project can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. URBEMIS-2002 contains default values for much of the information needed to calculate emissions. However, project-specific, user-supplied information can also be used when it is available.

Inputs to the URBEMIS-2002 program include trip generation rates, vehicle mix, average trip length by trip type and average speed. Trip generation rates for project land uses were provided by the project transportation consultant. Average trip lengths and vehicle mixes for the Bay Area were used. Average speed for all types of trips was assumed to be 30 MPH.

The URBEMIS-2002 run assumed summertime conditions with an ambient temperature of 85 degrees F.

The analysis was carried out assuming project build-out would occur by the year 2008. The URBEMIS-2002 output is attached.

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<sup>4</sup> Jones and Stokes Associates, Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module, Version 7.4, May 2003.

## URBEMIS 2002 For Windows 7.4.2

File Name: <Not Saved>  
 Project Name: Santa Clara Square  
 Project Location: San Francisco Bay Area  
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT  
 (Pounds/Day - Summer)

## UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Apartments low rise	28.62	27.61	289.63	0.19	28.27
Retail	42.77	44.09	439.21	0.27	40.54
TOTAL EMISSIONS (lbs/day)	71.39	71.71	728.84	0.46	68.82

Includes correction for passby trips.  
 Includes a double counting reduction for internal trips.

## OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2008 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

## Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Apartments low rise	5.92 trips / dwelling units	488.00	2,888.96
Retail	61.90 trips / 1000 sq. ft.	131.00	8,108.90

## Vehicle Assumptions:

## Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.00	1.60	98.00	0.40
Light Truck < 3,750 lbs	15.00	2.70	95.30	2.00
Light Truck 3,751- 5,750	16.20	1.20	97.50	1.30
Med Truck 5,751- 8,500	7.20	1.40	95.80	2.80
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.40	0.00	50.00	50.00
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.70	76.50	23.50	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	8.30	83.30	8.40

## Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.8	4.6	6.1	11.8	5.0	5.0
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip Speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	27.3	21.2	51.5			

## % of Trips - Commercial (by land use)

Retail	2.0	1.0	97.0
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Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2008.  
The double counting internal work trip limit changed from to 162.178.  
The double counting shopping trip limit changed from to 81.089.  
The double counting other trip limit changed from to 1487.8144.  
The travel mode environment settings changed from both to: none